GLOSSARY

Section I
Abbreviations

ac
Alternating Current

AGM
Absorbed (or Absorptive) glass mat

ANSI
American National Standards Institute

C4ISR
Command, Control, Communications, Computer, Intelligence, Surveillance, and Reconnaissance

CBEMA
Computer Business Equipment Manufacturers Association

dc
Direct Current

EM
Electromagnetic

FCC
Federal Communications Commission

FET
Field Effect Transistors

GTO
Gate Turn Off

HVAC
Heating, Ventilation, and Air Conditioning

IEC
International Electrotechnical Commission

IEEE
Institute of Electrical and Electronics Engineers

IGBT
Insulated Gate Bipolar Transistors

IITRI
IIT Research Institute

ITIC
Information Technology Industry Council

kW
Kilowatt

MDT
Mean Downtime

M-G
Motor-Generator

MOSFET
Metal Oxide Field Effect Transistor

ms
Millisecond

MTBM
Mean Time Between Maintenance

MTBF
Mean Time Between Failure

MTTF
Mean Time To Failure

MTTR
Mean Time To Repair

MVA
Mega Volt Amperes

NEC
National Electrical Code

NEMA
National Electrical Manufacturer’s Association

NFPA
National Fire Protection Association

Ni-Cad
Nickel-Cadmium

PCB
Printed Circuit Board

PWM
Pulse Width Modulation

RF
Radio Frequency

RFI
Radio Frequency Interference

RMS
Root Mean Square

rpm
Revolutions Per Minute

SCR
Silicon Controlled Rectifier

SLA
Sealed Lead-Acid (also see VRLA)

THD
Total Harmonic Distortion

TM
Technical Manual

UL
Underwriters Laboratories

UPS
Uninterruptible Power Supply

VRLA
Valve Regulated Lead-Acid

Section II
Terms

Absorbed (or Absorptive) Glass Mat (AGM)
In an AGM cell, the electrolyte is absorbed and held in place with a microfibrous silica glass mat sandwiched between the plates. The electrolyte is and remains liquid for the entire battery life. The glass mat is only about 90 percent saturated with electrolyte, therefore, oxygen produced during charge can readily migrate to the negative plate and recombine into water. This recombination mechanism, along with charge voltage control, substantially eliminates water loss, making the AGM batteries as non-spillable and maintenance-free as possible. Properly supported, AGM batteries with absorbed electrolyte can be installed and operated on their side.

Active Redundancy
[see Redundancy (active)]

Alternate Power Source
[see Power Source (alternate)]

Availability
In its simplest definition, availability is uptime divided by downtime. In terms of reliability (MTBF or MTBM) and maintainability (MTTR or MDT), inherent and operational availability are defined as:

$$\text{Inherent availability} = Ai = \frac{MTBF}{MTBF + MTTR}$$

$$\text{Operational availability} = Ao = \frac{MTBM}{MTBM + MDT}$$

Backup Time
Time during which the UPS can supply the rated load with nominal-quality power while the mains are down. This time depends on the battery and the efficiency of the UPS. Typical backup ranges from five minutes to several hours.

Battery
A device that converts chemical energy into electrical energy by means of an electrochemical reaction. Usually defined as consisting of two or more cells, but commonly used to refer to one cell.

Battery (flooded cell)
An electrolyte filled vented cell.

Battery (recombination)
Battery with a gas recombination rate at least equal to 95 percent, i.e., no water need be added over battery life. Usually called “maintenance free.”

Battery (tier-mounted)
Battery cell installation system whereby the cells are placed on tiers made of insulating material.

Battery (vented cell)
The battery cells are equipped with a filling port for distilled, demineralized water used to top up the free electrolyte.

Battery Cells
The interconnected battery elements that supply electrical power created by electrolytic reaction.

Battery Circuit Breaker
[see Circuit Breaker (battery)]

Battery Monitor
Battery monitoring and protection system developed and patented by MGE UPS SYSTEMS for UPS systems. It incorporates software to calculate the real available backup time, predicts when batteries need replacement, and is a protection system against excessive discharges.

Battery on Shelves
Battery cell installation system whereby the cells are placed on several vertically stacked shelves or racks made of insulating material.

BEM (Building and Energy Management) System
System used for control/monitoring of all building utilities and systems. It is generally composed of sensors, actuators, and programmable controllers connected to a central computer or several computers, equipped with specific software.

Brownout
Conditions under which power is available but not sufficient to fully meet the needs (voltage, current) of the load.

BS (British Standard)
Label used to indicate compliance with British standards.

Bypass
The use of parallel units in an UPS to increase capacity or for redundancy.

Bypass (automatic)
In the event of an overload or an unlikely UPS problem, your application is still powered thanks to the automatic bypass module.

Bypass (manual)
Manually operated switch used to supply the load via direct connection to utility power during servicing of the UPS system.

Capacity (battery)
The number of ampere-hours (Ah) a fully charged cell or battery can deliver under specified conditions of discharge.

Cell
The basic electrochemical element of a battery.

Charge (equalizing)
An extended charge to a measured end point that is given to a storage battery to insure the complete restoration of the active materials in all the plates of the cells.

Charger
Device associated with the rectifier and used to supply the battery with the electrical power [direct current (dc)] required to recharge and/or float charge the battery, thus ensuring the rated backup time.

Circuit Breaker (battery)
DC circuit breaker that protects the battery of an UPS.

Cos phi
A measure of the phase shift between the current wave and the voltage wave observed at the terminals of a load supplied with ac power at a given frequency.

Cos phi1
A measure of the phase shift between the fundamental current wave and the fundamental voltage wave observed at the terminals of a non-linear load .

Crest Factor (Fc)
Ratio between the peak current value to the root mean square (RMS) current value.

Cubicle (parallel UPS unit)
Cubicle containing a rectifier/charger and an inverter. It is connected to one or several other identical cubicles and a bypass cubicle to make up a parallel UPS.

Cubicle (single UPS unit)
Cubicle containing a rectifier/charger, an inverter, and a bypass. Connected to a battery, it operates alone, forming a single UPS. Compare with cubicle (parallel UPS unit).

Current (float)
DC current that maintains the battery at nominal charge, corresponding the float voltage. This current compensates open circuit losses.

Current (inrush)
Temporary current observed in a network when electrical devices are energized, generally due to the magnetic circuits of the devices. The effect is measured by the current's maximum peak value and the RMS current value it generates.

Current Harmonics
[see Harmonics (current and voltage)]

Current Loop (20 mA)
Transmission system used on certain devices and offering better performance than the RS232C. It provides a high degree of immunity to interference and is easy to implement, but has not been standardized.

Cycle
A battery discharge followed by a complete recharge. A deep (or full) cycle is described as the removal and replacement of 80 percent or more of the cell's design capacity.

Cycling
The repeated charge/discharge cycle of a storage battery. Some batteries are rated by their ability to withstand repeated, deep discharge cycles.

Diagnostics
Manual, automated, and semi-automatic methods and procedures for identifying and isolating a failure in an item.

Discharge Rate
The rate at which a cell or battery delivers current (e.g., 200 amperes over 10 hours is a rate of 20 amperes per hour).

Distortion (individual)
Ratio between the RMS value of an nth order harmonic and the RMS value of the fundamental.

Distortion (total)
Ratio between the RMS value of all harmonics of a non-sinusoidal alternating periodic value and that of the fundamental. This value may also be expressed as a function of the individual distortion of each harmonic: Hn = Yn /Y1.

Earthing System
System for the interconnection and earthing of exposed conductive parts and neutral. There are three types of neutral systems: IT, TN, TT.

Earthing System IT
Earthing system in which the neutral is isolated from the earth or connected to the earth via a high impedance and the various exposed conductive parts are connected to the earth via individual earthing circuits. An alarm must signal the appearance of a first insulation fault. The installation must be de-energized immediately in the event of a second insulation fault.

Earthing System TN
Earthing system in which the exposed conductive parts are interconnected and connected to the neutral. The neutral is connected to the earth. The installation must be de-energized immediately in the event of an insulation fault.

Earthing System TT
Earthing system in which the neutral and the exposed conductive parts are directly earthed. The installation must be de-energized immediately in the event of an insulation fault.

Electrode
The electrical connector and the associated active materials at which an electrochemical reaction occurs. Also referred to as the positive and negative plates in a secondary cell.

Electrolyte
The medium that provides the ion transport function between the positive and negative electrodes of a cell. In lead-acid batteries, the electrolyte is a mixture of water and sulfuric acid. A nickel-cadmium (ni-cad) cell uses a dilute alkaline mixture of potassium hydroxide in water.

Electromagnetic (EM) Compatibility
Possibility of a device to operate normally when installed near other devices, given the disturbances emitted by each device and their mutual sensitivities.

Emergency Power
An independent reserve source of electric energy that, upon failure or loss of the primary source, provides reliable power within a specified time to critical devices and equipment which, if they fail to operate satisfactorily, would jeopardize the health and safety of personnel, result in property damage, or cause loss of revenue.

Ferroresonant
An interactive UPS configuration in which a ferroresonant transformer is used to magnetically couple the ac input to the load.

Field Effect Transistor (FET)
A solid-state device in which current is controlled between source and drain terminals by voltage applied to a non-conducting gate terminal.

Filter (phase-shift)
Filter used to reduce, if necessary, the overall distortion due to the current harmonics injected into the mains upstream of an UPS by its rectifier-charger. Filtering is superior to that of a traditional filter of the L or C type.

Float Charge
Commonly used for applications in which the battery is only infrequently discharged, charging conducted with the charger, battery, and load in parallel. The charger operates off the normal power supply.

Float Current
[see Current (float)]

Floating Voltage
[see Voltage (float)]

Fourier Theorem
Theorem stating that any non-sinusoidal periodic function (frequency f) may be represented as a sum of terms (series) made up of a sinusoidal term with frequency f, called the fundamental frequency, n sinusoidal terms with frequencies that are whole multiples of the fundamental frequency, (harmonics), and a possible dc component. Where n is a whole number. n = 1 corresponds to the fundamental, n > 1 to the harmonic of the nth order.

Gell-Cell
Refers to a battery in which the electrolyte consists of a mixture of finely divided silica or sand mixed with a sulfuric acid solution. The gelled electrolyte is highly viscous and during charge and discharge can develop voids or cracks that impede acid flow and result in loss of battery capacity.

Harmonic
Sinusoidal term of the Fourier series expansion of a periodic function. The harmonic (or harmonic component) of the nth order is characterized by: Yn is the root mean square (RMS) value of the given harmonic component, w is the angular frequency of the fundamental, related to frequency by: $w = 2^1f$; phin is the phase angle of the given harmonic component at t = 0.

Harmonics
Distortions of the sine-wave that characterizes normal ac current. Harmonics are transmitted into an ac line by non-linear loads (i.e., loads that do not draw power in regular sine waves), such as computers, copiers, FAX machines, and variable-speed motors. Harmonics can cause communication errors and equipment damage. In three-phase systems, they can cause transformers and neutral conductors to overheat creating a possible fire hazard.

Harmonics (current and voltage)
All ac which is not absolutely sinusoidal is made up of a fundamental and a certain number of current harmonics which are the cause of its deformation (distortion) when compared to the theoretical sine-wave. For each current harmonic of order n and an RMS value In, there is a voltage harmonic with a RMS value Un. If Zsn is the voltage source output impedance for the harmonic of the nth order, then: Un = Zsn x In.

High-Frequency Interference
[see Interference (high frequency)]

Hybrid UPS
(see UPS, Hybrid)

Individual Distortion
[see Distortion (individual)]

Inrush Current
[See Current (inrush)]

Insulated Gate Bipolar Transistor (IGBT)
The IGBT is a minority carrier device and is fundamentally different in operation than a MOSFET, although they are similar in cross section.

Interference (high-frequency)
High-frequency parasitic current that is either conducted (electrostatic origin) or radiated (EM origin) by a device.

International Electrotechnical Commission (IEC)
Advisory organization that draws up international standards in the electrotechnical field.

Inverter
A device for converting dc to ac current.

Inverter (in UPS)
UPS subassembly that recomposes a sine-wave output (regulated and without breaks) using the dc current supplied by the rectifier-charger or the battery. The primary elements of the inverter are the dc/ac converter, a regulation system, and an output filter.

Inverter (off-line or stand-by)
UPS configuration in which the inverter is parallel-mounted to the load supply line and backs up the mains. This configuration offers a substantial cost reduction but is applicable only to low outputs, under 3 kVA, because it results in an interruption lasting up to 10 milliseconds (ms) during transfer and does not filter inrush currents.

Inverter (on-line)
UPS configuration in which the inverter is in series mounted between the mains and the load. All power drawn by the load passes via the inverter. This is the only configuration used for high outputs.

IP (protection index)
[see Protection index (IP)]

ISO 9000
Standard defining procedures and systems used to attain an internationally recognized level of production quality. ISO 9000 certification is proof that the quality system effectively complies with the standard. Certification is carried out by an official organization (AFAQ), unaffiliated with either clients or suppliers or the company itself, and is valid for a three-year period with yearly audits and checks.

Kilo Volt Amperes (kVA)
The product of the voltage and the amperes expressed in units of thousands. The resultant is total system power.

Kilowatt (kW)
The product of the voltage and the amperes and the power factor expressed in units of thousands. The resultant is “real” system power.

Life Cycle Cost (LCC)
The total costs incurred in the acquisition, operation and maintenance, and disposal of an item. For an UPS, from a customer perspective, life cycle cost includes the purchase price, installation costs, operating and support costs, and disposal costs.

Line-Interactive
An UPS configuration in which line power is fed directly into the load through a series inductor or transformer.

Load (linear)
Load for which voltage form and current form are similar. Voltage and current are related by Ohm’s law $U(t) = Z \times I(t)$.

Load (non-linear)
Load (generally with a switched-mode power supply) generating major harmonic currents. Current wave form is different from voltage wave form. Ohm’s law is not applicable. It can be used only with each harmonic.

Load Power
Apparent power Pu that the UPS inverter supplies under given load conditions. It is less than or equal to the rated output Pn. The ratio Pu/Pn defines the percent load of the inverter.

Load Shedding
The process of deliberately removing pre-selected loads from a power system in response to an abnormal condition to maintain the system’s integrity.

Maintainability
Relative ease and economy of time and resources with which an item is retained in, or restored to, a specific condition when maintenance is performed by personnel having specified skill levels, using prescribed procedures and resources, at each prescribed level of maintenance and repair. Measures include probability to repair within a given time, repair rate, and mean time to repair.

Manual Bypass
[see Bypass (manual)]

Mean Downtime (MDT)
The mean time during which an item is not available for operation for any reason, including active maintenance, lack of parts, lack of maintenance personnel, etc.

Mean Time Between Maintenance (MTBM)
A measure of reliability that addresses all reasons for support. Maintenance can result from inherent failures of the item, failures caused by operators or maintenance personnel (induced failures), preventive maintenance requirements, etc.

Mean Time Between Failure (MTBF)
A measure of reliability. Usually denotes the time between inherent failures (i.e., failures caused by a physical or chemical phenomena within the item.)

Mean Time To Failure (MTTF)
Mathematical calculation of the duration of normal operation of a non-reparable device, i.e., for which a MTBF is not possible. The product, expressed in hours, is an indication on the reliability of the device.

Mean Time To Repair (MTTR)
A measure of maintainability. Mathematical calculation (or statistical average if available) of the time required to repair a device.

Mega Volt Amperes (MVA)
The product of the voltage and the amperes expressed in units of millions. The resultant is total system power.

Micro-Outage
Total loss in the supply of power for 10 ms.

Monitor (system interface)
User interface on the Galaxy range of UPS systems. This interface includes an LCD alphanumeric display with two lines of 20 characters each and is used in conjunction with the Signal 4 interface.

Motor-Generator (M-G)
Power systems that use a rotating ac generator to generate the needed output power. A motor-generator that is powered by a battery or a diesel or gas-powered engine when utility power is lost, constitutes a rotary or hybrid UPS.

Noise level
Acoustical decibel level of a source of noise, measured according to the applicable ISO standard.

Non-Linear Load
(see Load)

No-Ox-Id
No-ox-id is a soft, wax based rust preventive lubricant. It contains a small amount of solvent for ease of application with a brush. It is non-drying and retains its properties indefinitely.

Off-Line Inverter
(see Inverter)

Off-Line or Standby
An off-line, or standby, UPS is switched on to power the load only when the primary power source is lost or fails. The interval of time from when the utility power is lost and the UPS picks up the load can range from 2 to 20 ms.

On-Line
An UPS that continuously powers the load from the inverter.

On-Line Inverter
(see Inverter)

Output (rated)
Apparent power Pn that the UPS can deliver under given load conditions (power factor = 0.8).

Overall Distortion
[see Distortion (overall)]

Oversizing
Increasing the capacity of an UPS beyond that required to exactly meet the needed power requirements. Oversizing allows an UPS to efficiently and effectively handle surges and provides for growth in the power requirements.

Overvoltage
Sudden increases in voltage on one or more phases of ac power caused by large changes in the electrical load or from utility power switching.

Parallel UPS Cubicle
[see Cubicle (parallel UPS unit)]

Parallel UPS with Redundancy
[see UPS (parallel with redundancy)]

Parallel UPS without Redundancy
[see UPS (parallel without redundancy)]

Percent Load
Ratio between the power Pu drawn by the load and the rated output Pn of an UPS system (Pu/Pn). Sometimes referred to as the load factor. Phase-shift filter [see Filter (phase-shift)].

Power Factor
The power factor is the mathematical relationship between apparent or effective power, measured in kVA, and real or average power, measured in kW. When the current and voltage are in phase, purely resistive load, the power factor is 1. In a purely reactive load in which voltage and current are 90° out of phase, the power factor is 0.

Power factor (l)
Ratio between the active power P supplied to a load and the apparent power S supplied to said load by an ac power supply.

Power Source (alternate)
Backup source used in the event of a mains failure. The connection time and the duration of the source depend on the type of source used.

Power Source (safety)
Power source for loads defined as critical by applicable safety regulations. This supply must not be affected by a mains failure and is generally separate from other supplies.

Primary Cell or Battery
A cell or battery that is not intended to be recharged and is discarded at the end of its useful life.

Prime Power
The normal source of power used continuously day and night. Usually supplied by an electric power utility but can be supplied by base-loaded user-generation.

Protection Index (IP)
Index indicating the capacity of an electrical device to resist environment conditions. It is made up of three digits (e.g., IP 205), each corresponding to a type of environmental risk. The higher the number, the greater the capacity to resist. First digit (0 to 6): capacity to resist penetration by solid objects. Second digit (0 to 7): capacity to resist penetration by liquids. Third digit (0, 1, 2, 3, 5, 7, 9): mechanical strength.

Pulse Width Modulation (PWM)
Inverter high-frequency chopping technique using a means of regulation enabling rapid modification of pulse widths over a single period. This makes it possible to maintain the inverter output within tolerances even for non-linear loads.

Radio Frequency Interference (RFI)
An unwanted electromagnetic signal that degrades the performance of the electronic device.

Rated Output
[see Output (rated)]

Reactance
Relative measurement (percent) of the internal impedance of an ac generator during harmonic phenomena. This reactance, also called the longitudinal subtransient reactance of the generator, is sometimes identified as X”d. For most common generators, the value ranges between 15 and 20 percent. It can drop to 12 percent for optimized systems and to 6 percent for special devices.

Recombinant Battery
A battery in which the cells are sealed with pressure relief valves that confine any gases produced during cell operation. These gases are then recombined back into water, substantially eliminating the loss of water from the cells and the need for water replenishment.

Recombination Battery
[see Battery (recombination)]

Rectifier
A device for converting ac to dc.

Rectifier/charger
UPS component that draws on the mains the power required to supply the inverter and to float charge or recharge the battery. The alternating input current is rectified and then distributed to the inverter and the battery.

Redundancy (active)
Parallel UPS configuration in which several UPS units with equal outputs are parallel connected and share the load. In the event one UPS unit fails, the other units pick up its share without any interruption in the supply of power to the load.

Redundancy (standby)
UPS configuration in which one or several UPS units operate on standby, with no load or only a partial load, and can immediately back up a faulty UPS unit by no-break transfer of the load, carried out by a static switch.

Reliability
The probability that an item will perform as intended for a specified period of time under a stated set of conditions. Usually measured as a probability, a failure rate, or a mean time between failures.

Reliability Centered Maintenance (RCM)
A maintenance program established to maximize the equipment reliability.

Rotary UPS
(see UPS, Rotary)

RS232C (recommended standard RS232C)
Standard defining the communication circuits between devices for synchronous and asynchronous transmissions on the following types of lines: two-wire, four-wire, point-to-point, telephone lines, and local links with short cables. Though the standard covers only transmissions over distances up to 15 meters, it is often possible to ensure correct transmission over greater distances using high-quality shielded cable in a reasonably satisfactory electrical environment. Most terminals and devices on the market can implement this transmission standard.

RS422A (Recommended standard RS422A)
Standard RS232C is sufficient for transmissions in a normal environment. For transmissions in a disturbed environment or over long distances, standard RS422A offers a differential operation option, with a balanced voltage, ensuring far superior performance. What is more, it can be used for multipoint links, with generally up to ten connection points (one sender and up to ten receivers).

RS485 (recommended standard RS485)
This standard is similar to RS422A except that the number of possible links is greater and up to 32 senders may be interconnected to as many receivers. This system is particularly designed for local-area networks.

Safety Installation
Installation supplying electrical equipment which may have a direct effect on the safety of users and must therefore remain energized even in the event of a main failure. In general, characteristics concerning the power supply and conditions for transfer to the safety source for such electrical equipment are covered by applicable regulations.

Safety Power Source
[see Power Source (safety)]

Sag
A low-voltage condition in which the voltage on one or more phases of ac power falls below 80 to 85 percent of the nominal value for more than one cycle ($1/60^{th}$ of a second for 60-cycle ac). Can be caused by ground faults, starting large loads, inadequate power supply, utility switching, utility equipment failure, and lightning. Can cause computer crashes and damage equipment.

Secondary Battery
A battery that may be restored to its charged state after discharge by passing an electrical current through the cell in the opposite direction to that of discharge. Also called a storage or rechargeable battery.

Single UPS
[see UPS (single)]

Single UPS Cubicle (see Cubicle)
[single UPS (unit)

Standby Power
An independent reserve source of electric energy that, upon failure or loss of the prime source, provides electric power of acceptable quality so that the facility may continue operation in a satisfactory manner (which could include an orderly shutdown).

Standby Redundancy
[see Redundancy (standby)]

Static Bypass Switch
Power-electronics device that can be used to switch from one source to another without interruption in the supply of power. In an UPS, transfer is from Mains 1 to Mains 2 and back. Transfer without interruption is possible due to the fact that there are no mechanical parts and the ultra-fast switching capabilities of the electronic components.

Static UPS
[see UPS (static)]

Subtransient Reactance of Generator
(see Reactance)

Surge
A high voltage condition in which the voltage on one or more phases of ac power exceeds 100 percent of the nominal value for more than one cycle ($1/60^{th}$ of a second for 60-cycle ac). Can be caused by a rapid load reduction or switching, and can damage equipment.

Thermal Runaway
A condition that is caused by a battery charging current that produces more internal heat than the battery can dissipate. This condition ultimately causes cell venting and premature failure.

Thevenin Generator
For a given load, it is possible to consider the power supply as a voltage generator, referred to as a Thevenin generator, made up of a perfect voltage Uo generator, in series with an internal impedance Zs: n Uo is the voltage measured across the load terminals, given that the load is to be disconnected (load terminals forming an open circuit), n Zs is the equivalent impedance as seen from the load terminals (again considered an open circuit), obtained by short-circuiting the upstream voltage generator(s).

Tolerance in Percent
Limit for allowable variations for a given quantity, expressed as a percent of the rated value.

Transformer Short-Circuit Voltage
Relative measurement (percent) of the internal impedance of a transformer. This short-circuit impedance is commonly called the short-circuit voltage because it is measured during a short-circuit test (shorted secondary winding subjected to a current set to In). For most common three-phase transformers, this value ranges between 3 and 6 percent.

Transients
Disturbances to electrical power lasting less than one cycle ($1/60^{th}$ of a second for 60-cycle ac). Also referred to as voltage spikes. Can be caused by lightning strikes, sudden load-shedding on the primary power system, shutdown of equipment that was drawing an extremely large amount of power, or a general rise in voltage on the primary power system after use by a large number of consumers. Voltage spikes can blow fuses or trigger circuit breakers, destroy electronic circuitry, and corrupt stored data.

Underwriters Laboratories (UL)
UL is a non-governmental, non-profit certification organization in the United States in which not only government authorities are represented, but also consumer groups, "export" services, research, etc. Following certification, a product may bear the UL label.

Uninterruptible Power Supply (UPS)
An electrical device providing an interface between the mains power supply and sensitive loads (computer systems, instrumentation, etc.). The UPS supplies sinusoidal ac power free of disturbances and within strict amplitude and frequency tolerances. It is generally made up of a rectifier/charger and an inverter together with a battery for backup power in the event of a mains failure.

Uninterruptible Power System (UPS)
Also used as the abbreviation for uninterruptible power supply. The latter is most often used for static (battery) backup power supplies for personal computers and other equipment with similar power requirements. UPSs include uninterruptible power supplies as well as more complex systems (e.g., rotary, hybrid, etc.).

UPS (parallel with redundancy)
An UPS made up of several parallel-connected UPS units with equal output ratings (P) and each equipped with its battery. If one unit fails, one or several of the others pick up the resulting excess load. If an UPS has a rated output n x P and is made up of n + k units, k is the level of redundancy for the entire set of n + k units.

UPS (parallel without redundancy)
An UPS made up of several (n) parallel-connected UPS units with equal output ratings (P) and each equipped with its battery, for large loads. The total output is equal to the number of units multiplied by their individual output (n x P). In this configuration, no UPS unit is redundant.

UPS (single)
An UPS made up of one single UPS unit (rectifier/charger, inverter, and bypass) and a battery.
UPS, Hybrid
An UPS that combines the features of both a static and rotary UPS.

UPS, Multiple-Unit
An UPS in which two or more units share the load but neither can carry 100 percent of the load.

UPS, Parallel-Redundant
An UPS in which two or more units are arranged in parallel and each can carry 100 percent of the load.

UPS, Parallel-Unit
An UPS in which two or more units are arranged in parallel and not all units are required to carry 100 percent of the load.

UPS, Rotary
An UPS in which a M-G set is used.

UPS, Single Unit
An UPS in which one unit carries 100 percent of the load.

UPS, Static
A solid-state UPS relying solely on battery power.

Useful Life (battery)
The time over which a battery can deliver a useful (normally defined as 80 percent or more of the battery's capacity) amount of power.

UTE (Union Technique de l'Electricité)
French electrotechnical standards organization.

VDE
German electrotechnical standards organization.

Vented Battery
[see Battery (vented)]

Voltage (equalize)
The voltage applied during an equalizing charge. This voltage is sufficiently high to ensure that the local action of all cells is overcome.

Voltage (float)
DC voltage applied to the battery to maintain its charge level. This voltage depends on the type of battery, the number of cells, and the manufacturer's recommendations.

Volt Amperes (VA)
The product of the voltage and the amperes. The resultant is total system power.

Voltage Harmonics
[see Harmonics (current and voltage)]

Valve-Regulated Lead-Acid (VRLA)
A "sealed" battery in which the electrolyte is immobilized, a relief valve opens when the internal pressure (caused by oxygen and hydrogen generation) exceeds a predetermined value. VRLA provide a means of recombination of internally generated oxygen and suppression of hydrogen gas evolution to limit water consumption. The electrolyte is immobilized by using an absorbent separator (e.g., AGM) or a gelling agent.

Walk-In
The slow transfer of power from the battery back to the utility over a 10-20 second interval.